

Studies on Water Quality of Gandhisagar Lake, Nagpur, (M.S.), India.

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Abstract

Present study deals with the physico-chemical characteristics of Gandhisagar lake. The data harvested during the study period indicates that the status of pollution in the lake water. Mostly the religious activities affects the water body by contaminating the water with organic matter and ashes. The water is analysed for various important water quality parameters, that showed the depletion of values during summer season. More emphasis is made to measure the dissolved oxygen and biochemical oxygen demand in the lake water. All the parameters showed the seasonal variations.

The more quantity of pollutants and microbial population and their increase rate of activities tends to reduce the dissolved oxygen in lake water. Consumption of more oxygen by microbes depletes the oxygen levels in the water. Whereas, the overnight respiration of microflora also remains responsible to reduce the oxygen levels in the lake. Increased values of oxygen during winter may be due to dilution of pollutants in the more volume of lake water and reduced temperature of lake water. Dissolved oxygen showed the inverse relationship with the temperature in lake water. During the rainy days the surface runoff carries the soil with more decaying organic matter in the lake and which degradation causes the moderate values of oxygen in the water.

Key words: lake, water, pollution, season, dissolved oxygen.

Introduction

Lakes have more fragile ecosystem as they do not have or very little self purification capacity, and therefore it readily accumulate the pollutants. The increasing human population and their activities in recent years in and around the aquatic ecosystem and their catchment areas have contributed to a large extent of pollutants, which intern deteriorate the water quality leading to their eutrophication.

Gandhisagar lake is located at the middle of Nagpur city and having the most religious and cultural significance. The lake is mostly surrounded the urban population and logically there is no fear of pollution from the surrounded community. But the visiting localities for their recreation, religious activities, cultural activities are mostly contribute the various contaminants in the lake water. Most of the lakes around the Nagpur city are already on the verge of disappearance due to eutrophication, where as some of them are exposed to high vulnerability to degradation. These lakes therefore demand concerted attention towards a clear understanding of their ecosystem in order to mitigate further deterioration. Hence the purpose of this study was to investigate the present status of Gandhisagar lake in terms of its water quality and distribution of planktons in response to seasonal changes.

The lake water being polluted is not used for drinking purpose. Local inhabitants use water for various purposes like fisheries, post cremation activities, gauri visarjan, etc. Tradition of such activities mostly deteriorate the water, whereas, the attempts of NGO's, corporation and social activists are only responsible for the existence and presence of water in lake.



Material And Methods

The sampling of water is done once week and physicochemical and biological characteristics of lake is studied seasonally during summer, winter and rainy seasons. For the purpose of study four different areas of lake was selected on the basis of occurrence of human activities. Physicochemical and biological analysis of water was done by using standard methods of APHA (1989). Statistical analysis was done on the basis of substantial availability of findings for the reality and significance of the result.

Observations

Table-1. Physico-chemical characteristics of Gandhisagar lake water.

Parameter	Rainy season	Winter season	Summer season	Mean S.D.
1 Temperature (oC)	25.6	21.3	28.3	20.48 0.21
2 Transparency (cm)	80	110	98	99.57 6.88
3 T.D.S. (mg/l)	314	218	299	246.45 8.39
4 pH	7.2	7.9	7.6	317.26 5.62
6 Alkalinity (mg/l)	147	161	186	138.45 6.21
7 Hardness (mg/l)	271	237	347	247.21 12.32
8 Dissolved oxygen (mg/l)	7.9	9.6	5.4	6.42 0.351
9 B.O.D. (mg/l)	11.8	11	29	10.82 4.17
10 Ammonia (mg/l)	0.014	0.011	0.061	0.034 0.0035
11 Nitrites (mg/l)	0.021	0.029	0.016	0.019 0.0011
12 Phosphates (mg/l)	0.045	0.063	0.065	0.032 0.0031

Table - 2. Numerical abundance of zooplanktons (org/l) at different sampling stations during 2009-10

Sr.No.	Zooplankton	Stations				Total	% abundance
		A	B	C	D		
1	Protozoa	1940	820	930	990	4680	10.39
2	Rotifera	3010	2630	2320	2750	9980	22.16
3	Cladocera	2310	2460	2310	2510	9590	21.29
4	Copepoda	3680	2830	3270	2910	11930	26.49
5	Ostracoda	1470	1720	1690	1110	5990	13.30
6	Worms and larvae	600	810	990	470		
Total		13010	10970	10540	10520	45040	100

Figure 1.

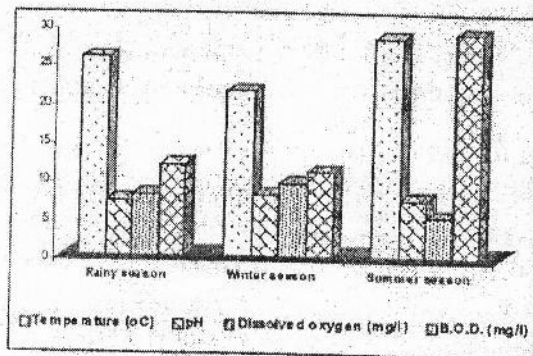


Figure 2.

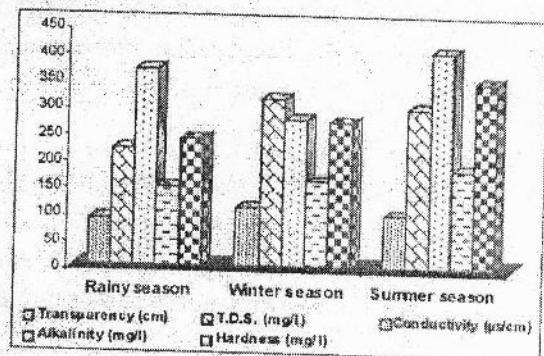


Figure 3.

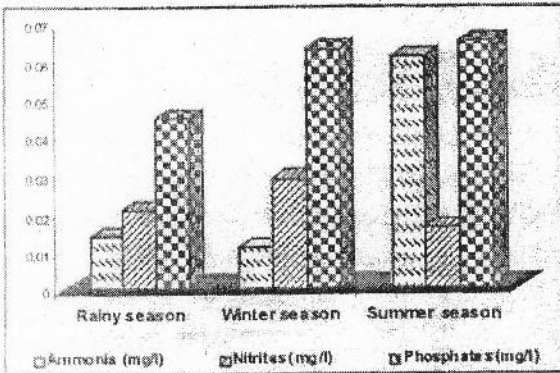


Figure 4.

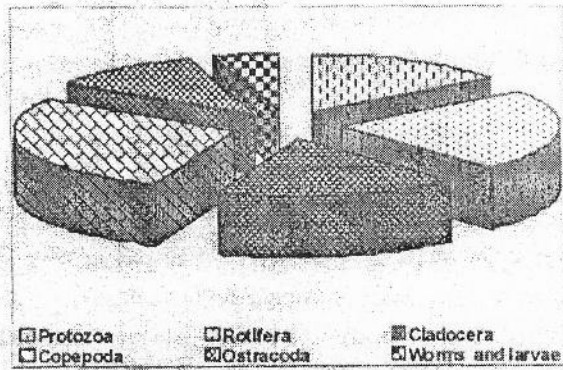


Figure 1,2,3 – Figure to show physical and chemical parameters in Gandhisagar Lake.
 Figure 4 - Figure to show total abundance of zooplanktons in Gandhisagar Lake.

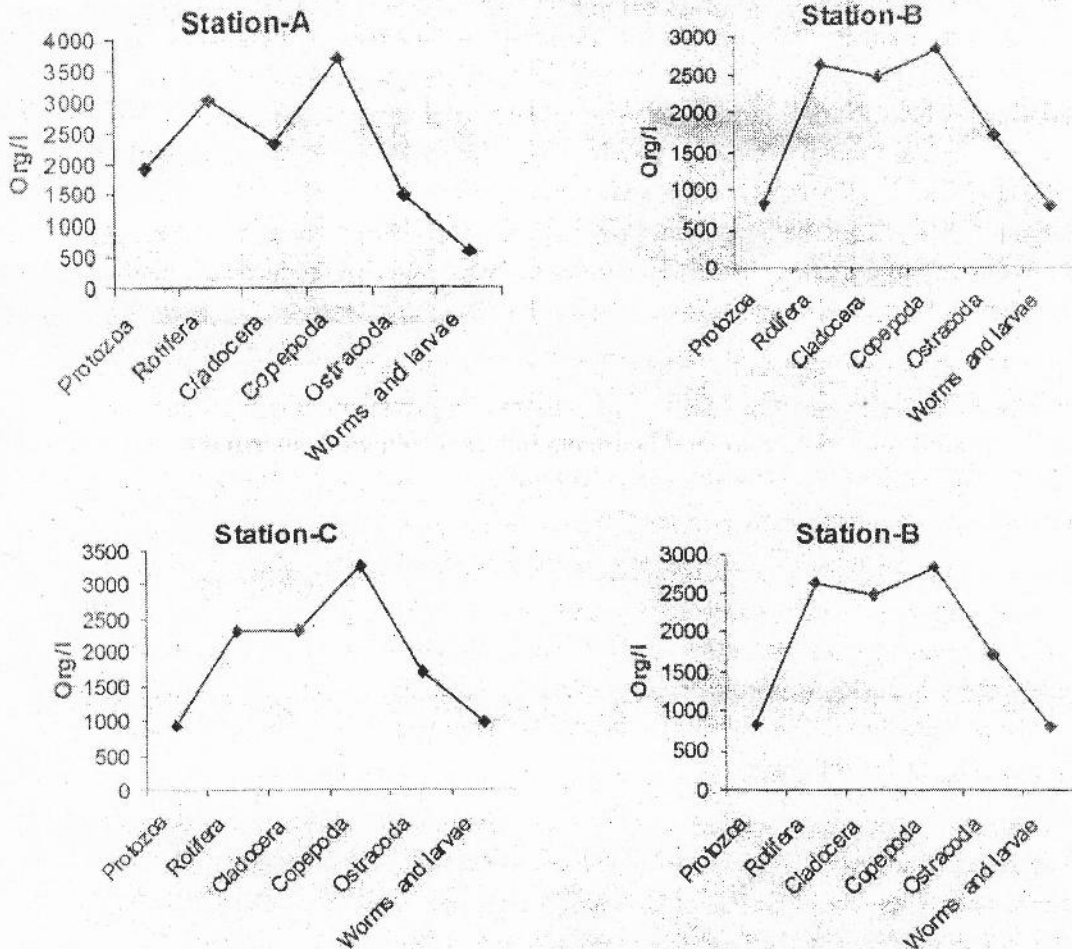


Figure – 5. Figure to show the abundance of zooplanktons at different stations.